REMARKS

Status of the claims

Claims 1-3, 5-6, 8-9, 12, 15-18, 20-21, 23, 27, 30-31, 34-37, 39-41 and 43-52 are pending in the application. Claims 1-3, 5-6, 8-9, 12, 15, 37, 39-41 and 43-52 are withdrawn. Claims 4, 7, 10-11, 13-14, 19, 22, 24-26, 28-29, 32-33, 38, 42 and 53 are cancelled. Claim 16 has been amended herein to incorporate the subject matter of claim 24. No new matter has been added with this amendment. As such entry and consideration thereof are respectfully requested.

Rejections under 35 U.S.C.§103

Claims 16-18, 20-21, 23-24, 27, 30-31, 34-36 and 53 remain rejected under 35 U.S.C.§103 as being obvious over Ritchie et al., in view of Papastavros et al. The Examiner maintains that Ritchie et al. discloses a process for preparing solid polyester granules, which is the product of a reaction of unsaturated polyester with styrene, wherein the initiating system has an amine of N,N-bis(2-hydroxymethyl)-p-toluidine and benzoyl peroxide. The Examiner notes that Ritchie et al. is silent regarding the use of more than one peroxide in the preparation of the solid polyester granules but asserts that the recited ratio of claim 16 of a ratio equal to or greater than 1:1 encompasses ratios wherein the second peroxide is only present in very low amounts, which would have no effect on the process. In addition, the secondary reference of Papastavros et al. is relied on for teaching the use of a two peroxides in a polymerization reaction.

As noted , the Examiner acknowledges that Ritchie et al. is silent on the use of more than one peroxide in the process of preparing solid polyester granules. However, the Examiner asserted that the specified ratio in the claims of the application can be satisfied by a ratio of 1000000:1 or even higher. Claim 16, as amended recites, "preparing a solution of unsaturated polyester and a combination of diacyl peroxides in styrene, wherein the combination of diacyl peroxides comprises diaroyl peroxide and dialkanoyl peroxide having a diaroyl peroxide to dialkanoyl peroxide mole ratio that **ranges from 1:1 to 10:1**". Thus, while the position of the Examiner is legally incorrect, it is rendered moot by the express recitation of an upper and lower limit of the ratio of diaroyl peroxide and dialkanoyl peroxide.

With regard to the assertion that the instant invention would be obvious over the combined teachings of Ritchie et al. and Papastrvros et al., Applicants maintain, as discussed in

detail below, that one skilled in the would not find any suggestion of the invention from reference teachings.

In the Advisory Action issued on November 14, 2011, the Examiner maintains the rejection based on the following two points, which are addressed in turn.

1) In the first portion of the discussion on page 2 of the Advisory Action, the Examiner asserts that the data in the specification is insufficient to show that the reduction in residual styrene is an inherent property because "the amount of residual styrene is a complex function of several parameters…". Applicants respectfully respond that the Examiner is legally incorrect in his position. While the data of Tables 1 and 3 do show a wide variation in the amount of residual systrene depending on, e.g. the ratio of peroxides used or tertiary aromatic amine used, it is clear from the comparative examples in both tables that when only a single peroxide is used, the amount of residual styrene goes up dramatically. Thus, the data consistently demonstrate the combined use of the diacyl peroxides as recited in the claims gives unexpectedly improved results.

2) In response to Applicants' arguments that the teachings of Papastavros et al. would not be considered relevant to the instantly claimed process, the Examiner states "Regarding applicant's argument, that temperature stabilization is not a concern in a suspension or emulsion polymerization…." and then provides a reference demonstrating that "desirability to conduct suspension polymerization with precise control of polymerization temperature are pointed out". From the Examiner's comments in the Advisory Action it appears to Applicants that the arguments of November 3, 2011, were not sufficiently clear. As such, Applicants clarify the arguments regarding the teachings of Papastavros et al. herein. In addition, Applicants submit evidence in support of their position.

In particular, Applicants note that the point discussed on page 4 of the response of November 3, 2011, was specifically that the issue was not whether or not suspension polymerization required temperature control, but rather that any teachings in Papastavros et al. regarding bulk polymerization reactions would not be considered applicable to the suspension or emulsion polymerizations (as with Ritchie et al. and/or the present invention).

As previously stated, the Examiner cannot simply arbitrarily combine the disclosures of Ritchie and Papastavros. There needs to be something more in the combined disclosure than

merely the presence of all relevant features defined in the claims of the present application. As reaffirmed in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007),

> Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness....a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.

The claimed process involves polymerizing styrene and unsaturated polyester monomers using a suspension/emulsion polymerization technique. The suspension/emulsion polymerization according to the invention requires the use of specific reagents and reaction steps, as recited in the claims. Ritchie et al. also regards suspended/emulsion polymerization. Papastavros discloses an apparatus and process for manufacturing supported solid polymeric sheets. The problem addressed in Papastavros relates in general to the mechanization/automation of preparing such supported solid polymeric sheets. Papastavros addresses this problem by teaching an apparatus for producing a substrate interposed between two sheet materials, with the sandwich structure being adhered through use of a polymerizable liquid introduced between the layers of the structure. Papastavros is not related in any way to the preparation of polyester granules, let alone addressing the problem of high styrene monomer residue present in such granules. Thus, while Papastavros may be broadly said to pertain to polymers, one skilled in the art would not consider the disclosure of Papastavros to have any relevance to the technology disclosed in Ritchie et al. or any relevance to the instant invention. Thus, one of ordinary skill in the art would not have any reason to combine the disclosure of Papastavros with the disclosure of Ritchie.

In support of the rejection the Examiner states that Papastavros "teaches polymerisation process of liquid vinyl monomers and unsaturated polyesters in the presence of initiators and catalyst systems comprising two peroxides ....". However, Papastavros only makes reference to polymerizing liquid vinyl monomers and "unsaturated polymers" and not "unsaturated polyesters", as suggested by the Examiner. Moreover, Papastavros makes no reference or suggestion whatsoever of using as the polymerizable liquid monomers, styrene and unsaturated polyester.

As discussed previously, and as believed to be misunderstood, the polymerization process disclosed and exemplified in Papastavros is a bulk polymerization. The instant invention and

that of Ritchie et al. is a suspension/emulsion polymerization. Bulk and suspension/emulsion polymerizations are two entirely different polymerization techniques requiring different apparatus and reagents. The techniques/methods and apparatus used in bulk polymerization and suspension/emulsion polymerization are not interchangeable.

Suspension/emulsion polymerization processes are "heterogeneous." With suspension/emulsion polymerization, the polymer is formed as a separate particulate phase in either water or organic solvent. The monomer and initiating species used will partition differently into the different phases depending on their solubility. Some of these species will exist in the polymer phase and some will be dissolved in the continuous phase. A further requirement in suspension/emulsion polymerizations is maintaining the colloidal stability of the resulting polymer.

In contrast, bulk polymerization, as in Papastavros, is a homogeneous system. Thus, with Papastavros all of the reagents used to form the polymer (and the resulting polymer itself) are dissolved in the solvent. Thus, with the bulk polymerization of Papastavros there is no partitioning into different phases. Bulk and emulsion/suspension polymerizations are considered in the art to be considerably different not only in terms of the reagents required to perform the polymerization, but also in terms of how the polymerization proceeds. One of ordinary skill in the art would not consider the disclosure in Papastavros to be applicable or relevant to suspension/emulsion polymerization reactions.

Papastavros does make reference to using a combination of initiators. However, the purpose of the combined initiators in Papastavros is to avoid generating a large exotherm during the bulk polymerization process. The problem addressed in Papastravos has absolutely no relevancy to producing polyester granules having a reduced level of styrene monomer residue (the problem addressed by the instant invention). The present invention achieves the solution of producing polyester granules having a reduced level of styrene monomer residue, with the specifically combined ratio of diaroyl and dialkanoyl peroxides recited in the clams. As noted, Papastavros discloses a combination of initiators to avoid generating a large exotherm during the bulk polymerization. However, as possible suitable combinations of initiators, Papastavros contemplates a variety combinations, the majority of which are not a combination even of peroxides, let alone diaroyl and dialkanoyl peroxides. There is nothing in Papastavros that would point one skilled in the art to a combination of diaroyl and dialkanoyl peroxides. Nor

would one skilled in the art even look to the processes of Papastavros when developing a suspension/emulsion polymerization process.

Attached hereto is a Declaration of co-inventor Dr. Algirdas SERELIS, submitted under 37 C.F.R.§1.132. In paragraphs 1-6, Dr. SERELIS provides his background information and expertise. In paragraph 8, Dr. SERELIS explains the subject matter of the instant invention. In paragraph 11, Dr. SERELIS provides his opinion of the teachings of Ritchie et al.. Dr. SERELIS states that Ritchie et al. "is concerned with the use of a particular class of tertiary aromatic amines as reductants for diacyl peroxides as a means to generate radicals for initiating crosslinking polymerization in styrene-polyester droplets…This invention deals specifically with single peroxides as the oxidising component of the redox couple."

In paragraph 12-16 of the Declaration, Dr. SERELIS discusses Papastavros et al. and the relevance of the reference teachings to the instant invention. Dr. SERELIS states that the reference teachings regard bulk polymerization in sandwiched sheets. The present invention, on the other hand, is drawn to the aqueous dispersion-type polymerization aimed at pumpable slurries of fine particles. Dr. SERELIS states that "These two types of polymerization techniques have widely differing requirements and limitations. Among the most significant are the distribution of initiator with respect to monomer, the loci of initiation, and the temperature limits imposed by the reaction medium."

Dr. SERELIS notes that the disclosure of Papastavros et al. is primarily concerned with the apparatus being used and not the use of the initiators, either solely or in combination. It is noted that "The equipment, reagents, skill and knowledge to perform bulk polymerization as described in Papastavros et al. is vastly different to that required to perform the suspension polymerization that is the subject of Such et al. [the invention]." Dr. SERELIS states that,

> it is well known that the distribution of initiator with respect to monomer, the loci of initiation, and the temperature limits imposed by the reaction medium for both bulk and suspension polymerization are vastly different. This can be appreciated by understanding that in bulk polymerization the polymerization reaction occurs throughout the entire reaction medium, whereas in suspension polymerization the reaction medium consists of monomer droplets suspended throughout a continuous aqueous phase and the polymerization reaction occurs only within the suspended monomer droplets. For at least these reasons, any technical know-how relating to one such technique is unlikely to, and in most cases will not, translate to the other. I am therefore of the opinion that a person looking to address the problem of Such et al. would simply not consider Papastavros et al. as a source of

potentially relevant technical information.

With regard to any disclosure in Papastavros et al. relating to the use of initiator combinations, Dr. SERELIS notes that such combinations are not even based on diacyl peroxide type initiators. The use of initiator combinations in the reference is seen to be concerned with how the combinations maintain a reasonably constant concentration of radicals in the presence of excessive polymerization exotherms. The exotherms are detrimental because they cause premature depletion of initiator in the desired time frame of the production process. Dr. SERELIS states that providing a constant concentration of radicals is not relevant to the instant invention.

In paragraph 16 of the Declaration, Dr. SERELIS discusses the use of cooling in Papastavros et al. and states that the cooling in Papastravros et al. further supports the differences between bulk polymerization and the suspension polymerization. Importantly, suspension polymerizations do not require external cooling due to the fundamentally different mode of polymerization that occurs (referencing to paragraph 14 of the Declaration). Thus, "achieving temperature stabilisation of the polymerization in Papastavros et al. requires entirely different consideration to, and entirely different process conditions and equipment from, the polymerization in Such et al. [the invention]". Dr. SERELIS concludes by stating

> In my opinion, the application, the medium, the mode and extent of use, and the intent behind Papastavros et al.'s use of initiator combinations are practically and technically removed from the work of Such et al. I do not consider Papastavros et al. to be relevant prior art. Ritchie et al. is also not considered relevant because it makes no reference at all to using complementary diacyl peroxide pairs. Furthermore, I would not be motivated in any way to combine the disclosure of Papastavros et al. with Ritchie et al. in order to solve the problem of Such et al. and thereby arrive at the claimed invention in that application. In particular, faced with developing a suspension polymerization process, I would not be drawn to the disclosure of Papastavros et al. due to its focus on bulk polymerization. In the event that I was to review the document, alone or in combination with Ritchie et al., there is nothing whatsoever in the disclosure(s) that would motivate me to select a particular mole ratio of two different diacyl peroxides (as required in Such et al.) over any one of the many other initiator combinations contemplated therein (most of which in any case are not in fact diacyl peroxides). Any teaching to use a combination of initiators in the context of bulk polymerization according to Papastavros et al. is, in my opinion, not practically or technically relevant to the suspension polymerization related problem with which in Such et al. is concerned.

Thus, as discussed in the Declaration of Dr. SERELIS, the disclosure of Papastavros et al. is of

no relevance to considerations for suspension/emulsion polymerization methods and one skilled in the art when looking to modify the teachings of Ritchie et al. would not look to the teachings of Papastavros et al. The instant invention is therefore not obvious over Ritchie et al. in view Papastavros et al. and withdrawal of the rejection is respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact MaryAnne Armstrong, PhD, Registration No. 40069, at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: February 6, 2012

Respectfully submitted,

By _____

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Attachment(s): Declaration and C.V. of Dr. Algirdas SERELIS